



**RICHLAND ONE**

ENGAGE • EDUCATE • EMPOWER

# Energy Efficiency & Capital Reinvestment Program

*ASCEM Project Share*

*October 6, 2022*

# Agenda



District Background & Goals



Phase 1: Supply-side efficiencies



Phase 2: Demand-side generation

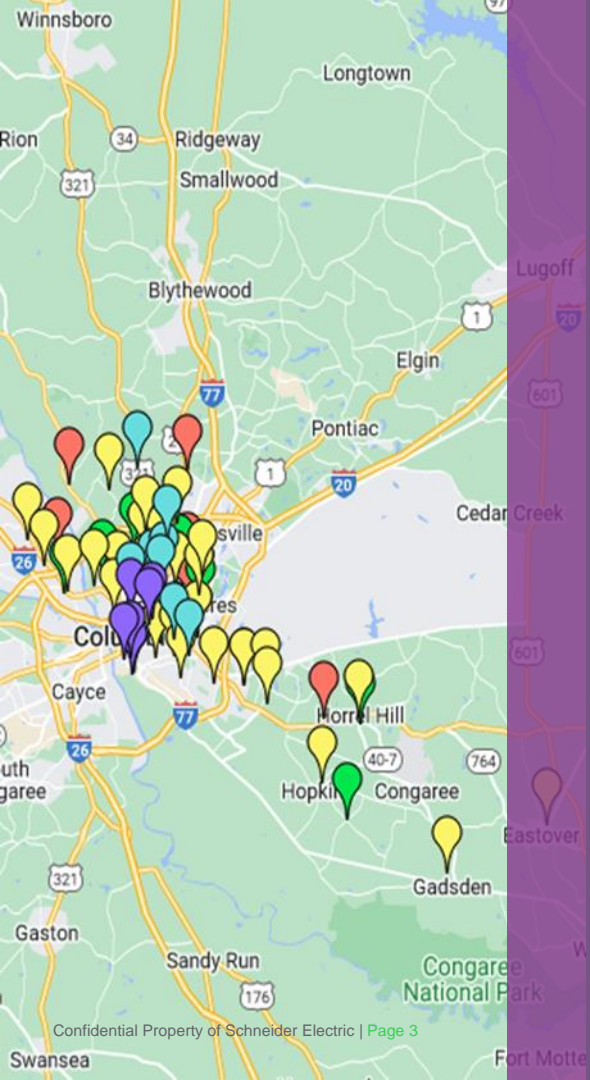


Impact



Engagement & Marketing





# Richland County School District One

## District Overview

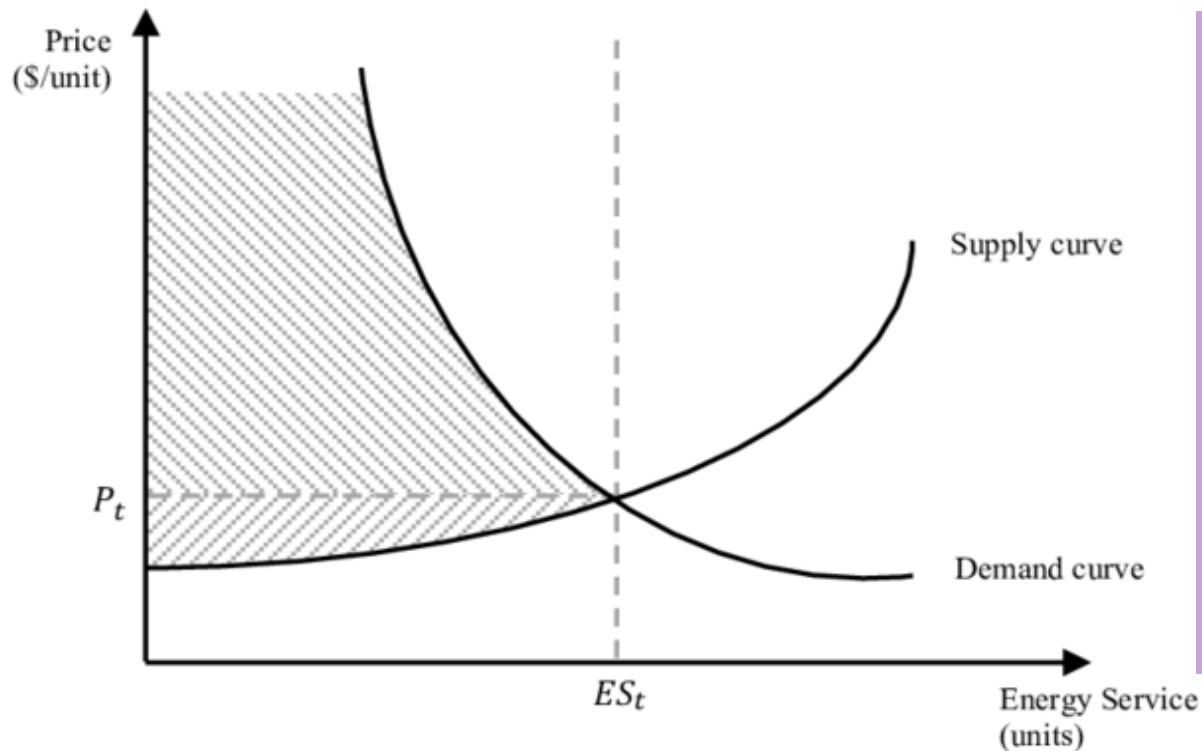
- 9<sup>th</sup> Largest School District in South Carolina
- 22,0000 Students
- 52 facilities across 480 square miles
- \$10M+ total annual utility expenditure
- Broad range of facility age and condition District-wide
- Segmented equipment standardization

# Advancing District Goals

-  **Reduce energy** costs and consumption
-  **Alleviate deferred maintenance** needs
-  **Enhance building health** in the learning environment
-  Improve **District performance**
-  Communicate Richland One's **positive news story**
-  Leverage new funding sources **without depleting 8% funds**



# Comprehensive Energy Strategy

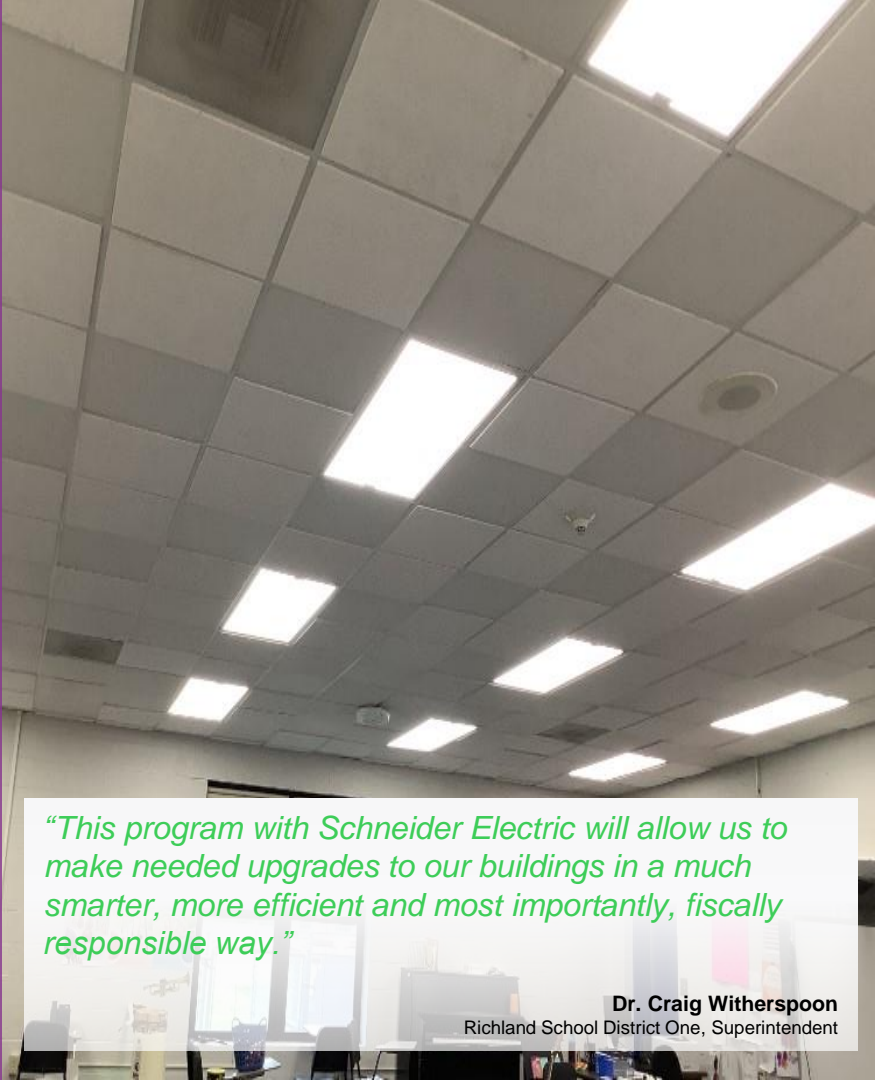




# Phase 1: Supply-side efficiencies

## Solution Overview

- Focus on the 15 highest energy consuming facilities
  - Reduced utility consumption by 24%
- \$28M total guaranteed savings / \$1M+ in annual savings
  - Replacement of 300+ mechanical systems
  - Upgrade lighting to LED both interior and exterior
  - Renovate to high efficiency plumbing fixtures for water conservation
  - Telecommunications overhaul to district-wide VOIP system
  - Building envelope enhancements
  - Plug load management technology
  - Upgrade & expand Building Management System
  - Modernize critical end-of-life electrical transformers



*“This program with Schneider Electric will allow us to make needed upgrades to our buildings in a much smarter, more efficient and most importantly, fiscally responsible way.”*

**Dr. Craig Witherspoon**

Richland School District One, Superintendent



## Phase 2: Demand-side Generation

*8.7MW of rooftop and carport solar PV*



# Solarize R1



## Carbon Neutrality

Leverage the Earth's greatest renewable resource to make significant progress towards a greater goal of limiting your impact on the environment.

- Track progress reducing the District's carbon footprint



## Fiscal Responsibility

Generate millions in utility savings by turning facilities into their own power generation systems.

- Lucrative solar net-metering legislation expired June 1<sup>st</sup>, 2021



## Expand Innovative Partnership

Leverage existing energy conservation project to mitigate District's risk

- With project underway, able to fast-track expansion of innovative solutions
- Engage students through creative curriculum component.



# Act 236 - Distributed Energy Resources Program Act

Source: [www.solar.sc.gov](http://www.solar.sc.gov)

## Net Metering:

An arrangement between utilities and customers who produce their own power (through solar panels, for example). If customers produce more electricity than they use, they sell any excess power back to the utility as a credit on following months' bills.

That means a utility gives a customer credit for every kilowatt-hour (kWh) of solar power not consumed by their (District) and returned to the utility's grid, thereby reducing their electricity bill.

- Customers who apply before **June 1, 2021** will be offered one-to-one credits until May 31, 2029.
- Customers who miss this deadline will be offered “solar choice metering tariffs” at wholesale rates of \$0.035/kWh.
- Significant financial risk of missing project timeline (\$\$M)



## Benefits of the Energy Net Metering Program:

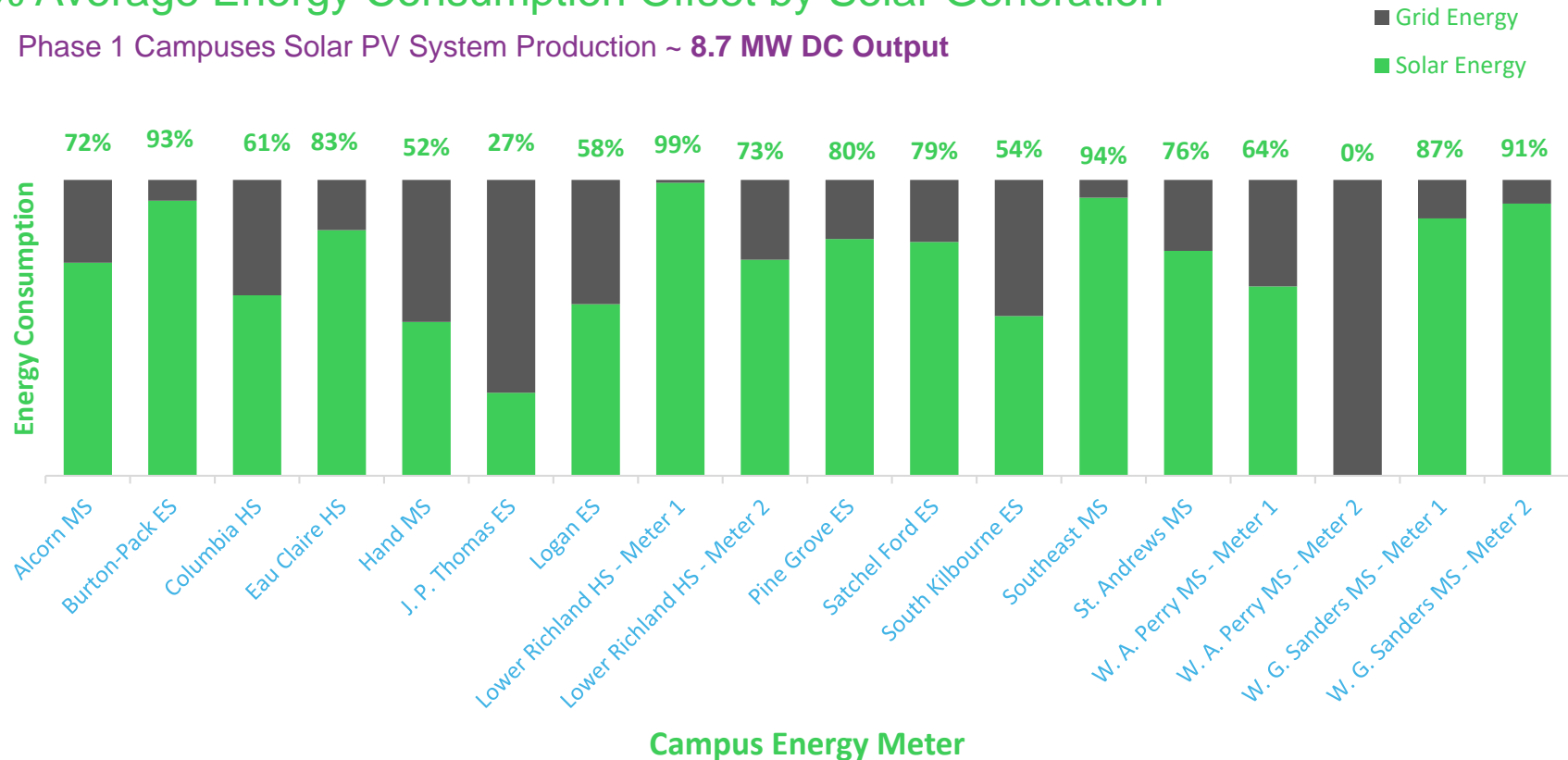
20 Years Solar PV Analysis (Projected Savings)				
Solar PV kWh Generation	\$ Building Electrical Cost Reduction (total off-set)	\$ Dominion Program Credits (total sell back)	\$ Total Program Value to R1	% Program Credits/Solar PV Electrical Cost Reduction
225,484,075	\$23,215,622	\$9,353,092	\$32,568,714	28.7%

**\$ Dominion Program Credits** – includes all program credits that Dominion Energy provides Richland on their electric bill over the 20-years – including 1:1 sell-back credits through 2029.

**\$ Building Electrical Cost Reduction** – The Solar PV system is supplying ~70% of the electrical energy demand at 15 schools.

# % Average Energy Consumption Offset by Solar Generation

Phase 1 Campuses Solar PV System Production ~ 8.7 MW DC Output



## PV Carports – Logan Elementary & Hand Middle School








# Real-time Measurement


Current Power  
335.65 kW

Energy today  
664.73 kWh

Energy this month  
38.03 MWh

Lifetime energy  
73.07 MWh





ID2862076

NameRCSO Southeast Middle School


AddressHorrell Hill Road 731,  
Hopkins, South Carolina, Unite...


Installed05/03/2022


Last Updated09/14/2022 10:48

Peak Power748.8 kWp


Sunny  
73.34 °F  
Feels like 73.94 °F  
Wind 3.48 MPH  
Humidity 55.6 %  
Sunrise at 07:06  
Sunset at 19:32

Tuesday  
  
62.6 - 84.2 °F  
Mostly Sunny

Wednesday  
  
62.6 - 84.2 °F  
Sunny

Thursday  
  
60.8 - 86 °F  
Mostly Sunny

Environmental Benefits

CO2 Emission Saved  
113,147.42 lb

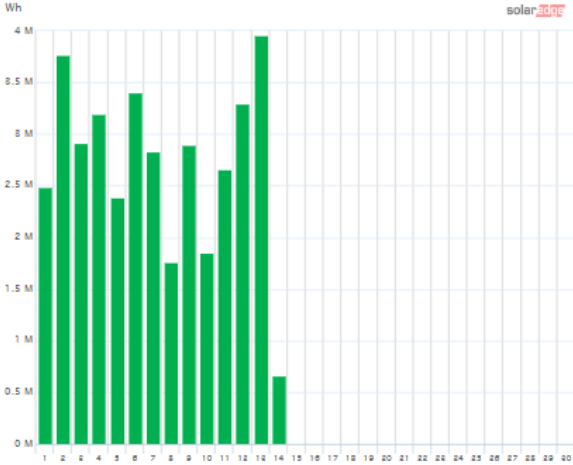
Power and Energy

Day Week Month Billing Cycle Year

09/01/2022 - 09/30/2022

System Production: 38.03 MWh

Wh




■ Solar Production

Sep2022

Apply

Previous monthNext month

Life Is On



# Current Installation Progress



Campus	% Complete	Guranteed kWh/yr	Sq. Ft.
Alcorn MS	100%	928,680	145,015
Burton-Pack Elementary	100%	732,683	81,663
Columbia HS	95%	1,259,658	335,137
Eau Claire HS	80%	1,427,409	290,860
Hand MS	75%	615,528	165,209
JP Thomas Elementary	100%	152,330	73,319
Logan Elementary	75%	226,719	67,525
Lower Richland HS	95%	1,480,368	344,971
Pine Grove Elementary	100%	572,479	76,244
Satchel Ford Elementary	100%	584,482	105,206
South Kilbourne Elementary	90%	304,164	57,749
Southeast MS	100%	963,881	137,059
St. Andrews MS	100%	833,240	180,928
WA Perry MS	100%	210,127	152,608
WG Sanders MS	95%	1,219,338	165,296
<b>Totals:</b>		<b>11,511,086</b>	<b>2,060,885</b>



An aerial photograph of a large, multi-winged building with a green metal roof. The roof is covered with numerous solar panels, arranged in a grid-like pattern across several sections. The building is surrounded by a parking lot with several cars parked. To the left of the building, there is a playground area with a blue slide and a yellow structure. The image is overlaid with a purple semi-transparent banner at the bottom, which contains the text "Financial Impact".

# Financial Impact



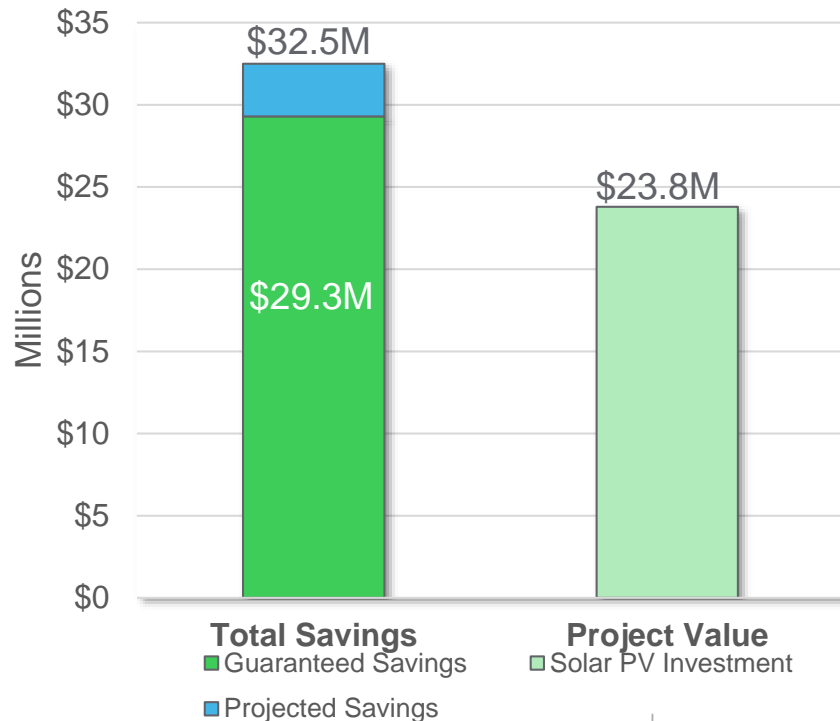
# Financial Analysis

## Project Summary

Strategically leverage **\$23.8M investment** to achieve **\$29.3M in guaranteed savings**

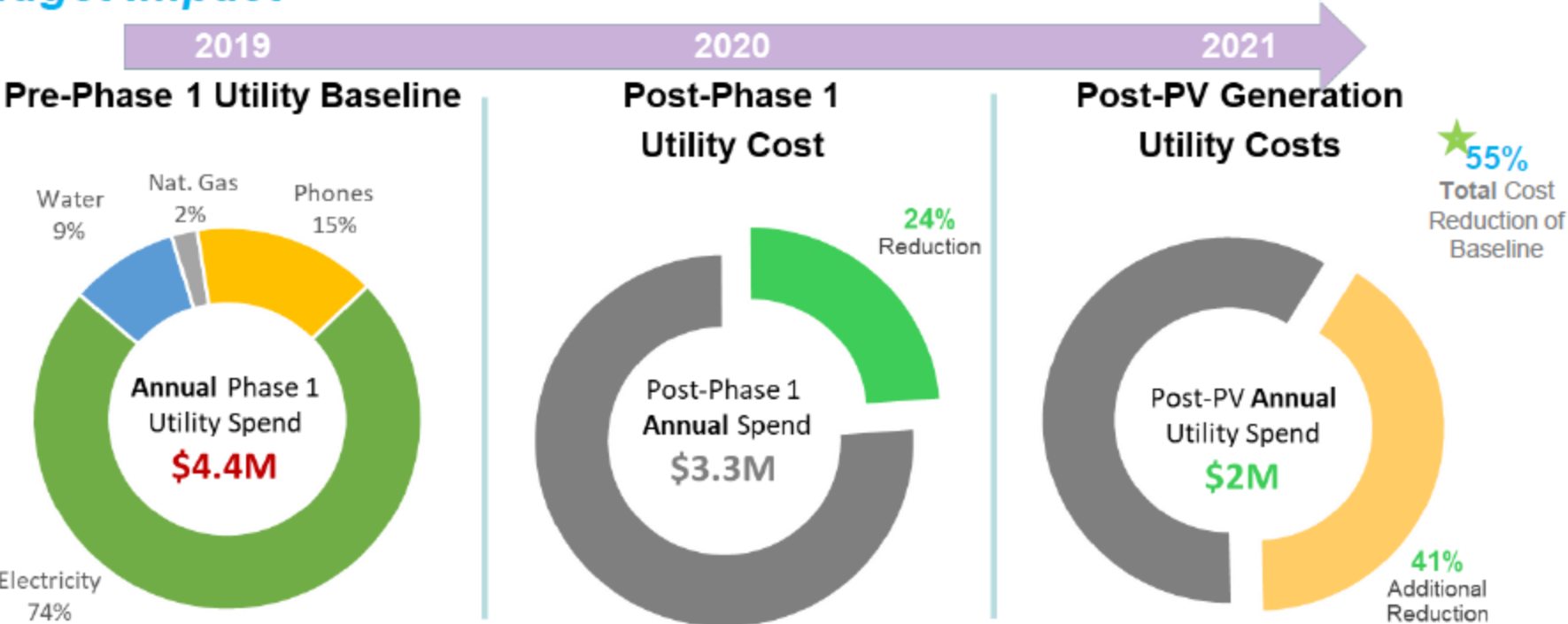
- **Average ~ 70% reduction in energy** purchased from the grid across 15 schools
- Solar PV System Production ~ **8.7 MW DC Output**, 20-year **Performance Guarantee**
- **1:1 Net Metering credit** through May 2029
- **20-year manufacturer product warranty** on equipment
- **25-year performance warranty** on **Solar PV modules**

Solar PV Amendment



# Combined Annual Utility Savings

## Budget Impact



# Marketing & Engagement



# Energy Education Curriculum

*The overall goal of including this curriculum is to empower educators and students with the knowledge and resources to create greener, healthier schools that use less energy, use energy more efficiently, add renewable technology, and incorporate best practices for sustainability.*

- Students utilize their own school building as a learning lab with lighting systems and solar arrays as hands-on visual tools for research.
- 21 activities spread over 10 lessons
- Fully aligned with Next Generation Science Standards

## Exploring Photovoltaic Technology



### Objectives

- Students will become familiar with physical characteristic and components of the photovoltaic system located at their school.
- Students will develop an understanding of how a PV system works.
- Students will understand that a PV system is a tool used to transform radiant energy into electrical energy
- Students will understand factors that influence the effectiveness of photovoltaic technology.

### Materials Needed

- Access to PV Array, Inverter, Data Acquisition System and Electric Meter
- Copies of Exploring Photovoltaic Arrays worksheet, one per student
- Clinchbaths or something hard to write on

## Time Required

- Preparation time: 10 minutes
- Activity time: 30 minutes

## Introduction

- \* Ask students to recall places they have encountered solar panels – don't forget the ones at the school!
- Explain to students that the technical term for a group of solar panels (which are comprised of solar cells) is a photovoltaic array, also known as a PV array. A PV array is an assembly of cells and panels that convert the energy of sunlight into electric energy.



### Discussion Guide

Students will have seen solar panels in a variety of places. Solar powered calculators and digital wristwatches are common. When driving past a road construction site it is likely they have seen a solar panel – almost all electronic construction signs are now powered by solar panels. Emergency call boxes that light up, some traffic lights, and outdoor home lighting might be powered using solarpanels.

- If you are doing this lesson as part of the Generating Tomorrow™ curriculum, ask students if they remember what irradiance is. Remind them that during the solar water heater experiments they tried to maximize irradiance.

- If you are doing this lesson in isolation, introduce the vocabulary word **irradiance** and have students record this word in their science notebooks.  
Irradiance is the amount of solar energy hitting a given area. Another word for irradiance is solar intensity. Ask students why irradiance would be an important concept when thinking about when using PV technology to produce energy.

- Explain to the students that during this lesson they are going to be taking a closer look at the photovoltaic (PV) array that was installed at their schools. Ask who has seen this array already. What color are the panels? What have they noticed about its design? Are the panels flat against the rooftop? Are they *only* in one area of a building? Allow time for open discussion.

- Tell the students that the goal of today's exploration is to find out what factors affect the performance of the array and its ability to meet the school's energy needs. Ask the students what kind of information they will need in order to know how effectively the array generates usable electrical energy. Brainstorm as a class and record the students' ideas someplace visible (chart paper, chalkboard, whiteboard, etc.). Remind students to draw upon the work they have already done as part of their energy studies.







"With how crucial the timing and scheduling was for this project, the collaborative and transparent environment that we worked in with the Schneider Electric team was very good. They have been a great partner to work with and so far we've been very pleased with everything that's been going on here."

**Miles Hanley**  
Energy Manager,  
Richland County School District One

## 2021 Energy Project of the Year – Richland One

Association of South Carolina Energy Managers

## 2021 Energy Manager of the Year – Miles Hanley

Association of South Carolina Energy Managers



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### New Solar Arrays Projected to Save Richland One \$57 Million

Tue, 10/19/2021

A new project between **Richland County School District One** and **Schneider Electric** is projected to reduce the district's energy bill by nearly 73% when completed next year.

The two-phase project will add solar arrays to the roofs of 15 district campuses and guarantee Richland One nearly \$57 million in energy savings during the next 20 years as the district aims to achieve net zero energy consumption, according to a news release.

A net metering program will allow the solar panels to generate renewable energy, reducing operational costs and providing financial credits to the district from its utility, Dominion Energy, for excess power generated but not consumed.

"School buildings with legacy equipment were a drain on energy and budgets," Justin Shutt, business development manager for Schneider Electric, said in the release. "We're pleased to help Richland One truly transform its infrastructure in a way that not only helps achieve their sustainability goals but also drastically cuts energy costs to free up millions of dollars for other district priorities."

The solar project is part of a district-wide **infrastructure modernization project** started in 2020 to upgrade HVAC systems and improve air quality. Savings and revenue will fund improvements across Richland One campuses and make the district less reliant on taxes for school upkeep and maintenance, according to the release.

The infrastructure project also generated new science, engineering, technology and math curriculum for the district, with students learning about energy generation, conservation, carbon impact and sustainability through hands-on labs featuring the upgraded equipment.

"STEM is a cornerstone of our curriculum across the district, and we are excited to show our students how the earth's natural resources can be transformed and create such a substantial impact in their lives," Miles Hanley, Richland One energy manager,



Energy Efficiency News - November 18, 2021  
South Carolina school district to save \$28M through energy upgrades



Start Next Done Print Email

Richland County School District One (Richland County) announced Oct. 30 that it will be saving on energy savings performance contract (ESPC) for efficiency upgrades that will save the district more than \$28 million in energy costs over 20 years.

The school district partnered with Schneider Electric on this project, which will complete upgrades to the HVAC systems, to the interior and exterior lighting, an electrical infrastructure that will reduce maintenance time and extend the life of the systems and for the building envelope to allow for better temperature regulation. It is expected that these upgrades will reduce utility and operational costs by 70% across 15 district buildings.

"Providing a safe, healthy and comfortable learning environment for our students and teachers is among our top priorities, especially now with new and changing regulations on our school learning environments," Dr.

Congratulations to South Carolina's  
**2021 Energy Project of the Year**  
**2021 Energy Manager of the Year,**  
**Miles Hanley**



in partnership with

Life Is On



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# *Questions?*



## Solar PV - Equipment Highlights

**Solar PV Modules** – Phono Solar “Mono crystalline” with 12-year product warranty and 25-year performance warranty

**DC/AC Inverters** – Solar Edge 20-year product warranty

**Solar Canopy** – RBI Solar

